

Potentiometric Surface Map of the Unconsolidated Aquifers of Hancock County, Indiana

by
Robert K. Schmidt
Division of Water, Resource Assessment Section
November 2012

Hancock County, Indiana is located in the central portion of the state. The majority of the county is situated in the East Fork White River Basin, however, a relatively small area in the northwest section is located within the White and West Fork White River Basin.

The Potentiometric Surface Map (PSM) of the unconsolidated aquifers of Hancock County was mapped by contouring the elevations of 1745 static water-levels reported on well records received primarily over a 50 year period. These wells are completed in aquifers at various depths, and typically, under confined conditions (bounded by impermeable layers above and below the water bearing formation). However, some wells were completed under unconfined (not bounded by impermeable layers) settings. The potentiometric surface is a measure of the pressure on water in a water bearing formation. Water in an unconfined aquifer is at atmospheric pressure and will not rise in a well above the top of the water bearing formation, in contrast to water in a confined aquifer which is under hydrostatic pressure and will rise in a well above the top of the water bearing formation.

Static water-level measurements in individual wells used to construct county PSM's are indicative of the water-level at the time of well completion. The groundwater level within an aquifer constantly fluctuates in response to rainfall, evapotranspiration, groundwater movement, and groundwater pumpage. Therefore, measured static water-levels in an area may differ due to local or seasonal variations. Because fluctuations in groundwater are typically small, static water-levels can be used to construct a generalized PSM. Groundwater flow is naturally from areas of recharge toward areas of discharge. As a general rule, but certainly not always, groundwater flow approximates the overlying topography and intersects the land surface at major streams.

Universal Transverse Mercator (UTM) coordinates for the water wells were either physically obtained in the field, determined through address geocoding, or reported on water well records; however, the location of the majority of the water well records used to make the PSM were not field verified. Elevation data were obtained from a digital elevation model. Quality control/quality assurance procedures were utilized to refine or remove data where errors were readily apparent.

Unconsolidated static water levels in Hancock County range from a high of 1012 feet mean sea level (msl) in the northeastern section of the county, to a low of 740 feet msl in the southwestern portion. Groundwater flow direction within the White and West Fork White River Basin is northwest toward Fall Creek, and generally to the south-southwest, toward Sugar Creek and the Big Blue River, in the East Fork White River Basin.

The county PSM can be used to define the regional groundwater flow path and to identify significant areas of groundwater recharge and discharge. County PSM's represent overall regional characteristics and are not intended to be a substitute for site-specific studies.